

**NOTES ON *OXALIS* SECT. *CORNICULATAE* (OXALIDACEAE)
IN THE SOUTHWESTERN UNITED STATES**

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ABSTRACT

Oxalis californica, *O. pilosa*, and *O. albicans* are distinct species of the southwestern USA and Mexico. Geographic summaries are provided and a species key includes these as well as *O. corniculata*, *O. dillenii*, and *O. stricta*, which also occur in the area. *Oxalis californica* is documented from south-central Arizona by collections from closely adjacent sites in Pinal and Maricopa counties in the Superstition Wilderness Area. Outside of its native range in California, and Arizona, and southwestern New Mexico, *O. pilosa* is reported from probable adventive occurrences in Nevada, Utah, and Oregon. *Oxalis albicans* is documented as an adventive in southern California. *Phytologia* 91(3): 527-533 (December, 2009).

KEY WORDS: *Oxalis albicans*, *Oxalis californica*, sect. *Corniculatae*, southwestern USA

Eiten (1963) treated *Oxalis albicans* Kunth, *O. pilosa* Nutt. ex Torr. & A. Gray, and *O. californica* (Abrams) R. Knuth as subspecies within a single species (*O. albicans*), emphasizing their similarities and putatively close evolutionary relationship. Lourteig (1979) subsumed both *O. albicans* and *O. pilosa* within the nearly cosmopolitan *O. corniculata* L., maintaining *O. californica* as a separate species. As at least implicitly recognized by both Eiten and Lourteig, and as emphasized here, *O. albicans* and *O. pilosa* are sympatric in Arizona and northeastern Mexico and *O. pilosa* and *O. californica* are sympatric in southern California. Considerable variability exists in *O. albicans* and *O. pilosa*, but the variation does not appear to be chaotic and where they are sympatric, intermediates between *O. albicans* and *O. pilosa* and between *O. pilosa* and *O. californica* appear to be relatively

uncommon. All (apparently) who have studied *Oxalis* in Arizona, where both the "albicans" and "pilosa" expressions occur widely and are represented by many collections, have agreed that two taxa are present. Evidence thus suggests that these taxa are reproductively isolated and that each of the three is appropriately treated at specific rank. The aim of the present report is primarily to document the major outlines of the geographic distribution of these species and to provide a guide toward their identification.

Oxalis dillenii Jacq. and *O. stricta* L., species native to the eastern USA, occur sporadically in western localities (Nesom 2009), presumably as adventives. In the southwestern USA, where plants of the *O. albicans* group occur, the PLANTS Database (USDA-NRCS 2009) records *O. stricta* from Arizona and New Mexico but I have not seen vouchers from those states; Ornduff and Denton (1998) cited Coconino Co. and Maricopa Co. for *O. stricta*.

Oxalis corniculata in the USA is recognized by its sparsely hairy stems creeping and rooting at nodes, all procumbent and radiating from the taproot, and its well-developed stipules with broad, free margins and auricled apices. Peduncles and 1(-3) leaves are produced at the nodes, short erect stems rarely. In the southwestern USA, it is an adventive that occurs sporadically as a lawn weed and in the vicinity of other horticultural endeavors. A form of *O. corniculata* (as collected and identified by George Eiten, numerous specimens at SMU) is common in central Mexico (collections seen from Hidalgo, Jalisco, Edo. Mexico, Michoacan, Morelos, and Queretaro) — these plants produce large, prominent stipules and nearly glabrous stems, but the habit varies from procumbent to ascending and the stems rarely root at the nodes. This expression apparently is a native form and perhaps has not been formally named.

Key to species of *Oxalis* sect. *Corniculatae* in the southwestern USA

1. Flowers usually (3-)5-7(-15) in regular or irregular cymes; stems with septate hairs on stems and petioles, sometimes few and concentrated at nodes, sometimes only on petioles...***Oxalis stricta***
1. Flowers 1 or 2-3 in umbelliform cymes; stems with only non-septate hairs.

- 2. Stems (at least on the proximal half) usually densely strigose with stiff, antrorsely closely appressed hairs.....**Oxalis dillenii**
- 2. Stems glabrous to glabrate, puberulent to hirsutulous-puberulent, or pilose.
- 3. Stems mostly prostrate, often rooting at the nodes, mostly radiating from a central point, taproot rarely becoming thick-woody; stipules with wide, free margins and apices.....**Oxalis corniculata**
- 3. Stems erect or erect and decumbent to prostrate, sporadically rooting at the nodes or not; stipules obsolescent or with very narrow, free margins, apices completely truncate, obsolescent.
- 4. Stems glabrous to very sparsely puberulent; peduncles 2–9 cm; sepals glabrous; stipules at midstem with narrow, free margins; flowers 1(–3).....**Oxalis californica**
- 4. Stems puberulent or pilose; peduncles 1.5–5 cm; sepals strigose to hirsute-strigose; stipules at midstem obsolescent or with narrow, free margins; flowers 1–2(–3).
- 5. Stems puberulent to hirsutulous-puberulent, hairs usually upcurved or crisped, sometimes straighter, longer hairs 0.2–0.3(–0.8) mm; stipules at midstem obsolescent or with very narrow, free margins**Oxalis albicans**
- 5. Stems sparsely to densely pilose, hairs spreading, irregularly oriented to somewhat regularly deflexed, longer hairs mostly 0.6–1.2 mm; stipules at midstem consistently with very narrow, free margins**Oxalis pilosa**

OXALIS CALIFORNICA (Abrams) R. Knuth, Notizbl. Bot. Gart. Berlin-Dahlem 7: 300. 1919.

Xanthoxalis californica Abrams, Bull. Torrey Bot. Club 34: 264. 1907.

Oxalis albicans subsp. *californica* (Abrams) Eiten, Amer. Midl. Naturalist 69: 303. 1963.

Oxalis californica var. *subglabra* Wieg., Rhodora 27: 119. 1925.

Flowering (Dec–)Feb–Apr(–Jun). Slopes and flats, brushy ridges, roadside banks, canyon bottoms, rock outcrops, grassland, oak chaparral, coastal sage scrub; (5–)30–800 m; Arizona, California; Mexico (Baja California).

Oxalis californica is recognized by its caulescent stems with reduced vestiture (glabrous to very sparsely short-puberulent), 1(-3) yellow flowers on long peduncles and pedicels, the corollas often drying with a blue or purplish tinge, and relatively wide, glabrous, and usually purplish- or pinkish-tinged sepals.

In California, *Oxalis californica* is known to occur in Los Angeles (including Santa Catalina Is.), Orange, Riverside, San Bernadino, San Diego, Santa Barbara (including Santa Cruz Is.), and Ventura counties. Plants of typical *O. californica* also have been collected in natural habitats at two sites in south-central Arizona, about 450 kilometers east of the closest localities in its previously known range in southern California and northern Baja California.

Maricopa Co.: Tonto National Forest, Superstition Wilderness Area, Fish Creek Canyon, ca. 2 mi from Tortilla Trailhead on Ariz Hwy 88, associated with *Populus fremontii* *Platanus wrightii*, *Cephalanthus occidentalis*, *Morus microphylla*, growing on steep, rocky slope, 2800 ft, 15 Mar 1993, *Rice 1604* (ASU). **Pinal Co.:** Tonto National Forest, Superstition Wilderness Area, Massacre Grounds, Forest Rd 78, ca. 1 mi to turnoff, T1N R9E S5SE, associated with *Ambrosia*, *Dodonea viscosa*, *Encelia farinosa*, *Lycium*, *Quercus turbinella*, 2400 ft, 5 May 1992, *Rice 1209* (ASU). Lourteig (1979) also recorded a collection of *O. californica* from Arizona: **Maricopa Co.**, Mesquite Creek, ca. 1 mi E of Tortilla Flat, ca. 1500 ft, 31 Mar 1963, *Halverson 54* (BM).

Oxalis pilosa Nutt. is similar in habit to *O. californica* and occurs abundantly in the Superstition Wilderness Area in localities close to those of *O. californica*: **Maricopa Co.**— *Rice 1425* (ASU); **Pinal Co.**— *Rice 249, 356, 729, 1695, 1698* (all ASU). It is distinguished from *O. californica* by its pilose stems, shorter peduncles and pedicels, and narrower, strigose, gray-green sepals.

OXALIS PILOSA Nutt. ex Torr. & A. Gray, Fl. N. Amer. 1(2): 212. 1838.

Oxalis albicans subsp. *pilosa* (Nutt. ex Torr. & A. Gray) Eiten, Amer. Midl. Naturalist 69: 303. 1963.

O. corniculata subsp. *pilosa* (Nutt. ex Torr. & A. Gray) Lourteig, Phytologia 42: 134. 1979.

O. corniculata var. *pilosa* (Nutt. ex Torr. & A. Gray) B.L. Turner, Phytologia 77: 4. 1994.

O. wrightii A. Gray var. *pilosa* (Nutt. ex Torr. & A. Gray) Wieg., Rhodora 27: 120. 1925.

Flowering (Feb–)Mar–Jun(–Oct). Juniper-grassland, pinyon-juniper, oak-juniper, oak, oak-pine, rocky and grassy hillsides, riparian woods (sycamore-walnut, cottonwood-willow), canyons, streamsides, washes, gravel bars; (700–)900–1900(–2000) m; Arizona, California, New Mexico, Nevada, Oregon, Utah; Mexico (Baja California, Chihuahua, Coahuila, Durango, Nuevo León, Sonora).

The native distribution *Oxalis pilosa* is primarily in Arizona, southern California, and northwestern Mexico — it occurs as a probable adventive in peripheral localities, documented here.

Nevada. Washoe Co.: Reno, sidewalk weed, 6 Jul 1980, *Tiehm 6142* (MO). **New Mexico.** Hidalgo Co.: Peloncillo Mts., Guadalupe Cyn, 7 Apr 1979, *Spellenberg 5072* (NMC, as reported by Spellenberg et al. 1986). **Oregon.** Benton Co.: Corvallis, weed in garden, 7 Oct 2005, *Halse 6888* (ASU). **Utah.** Washington Co.: St. George, lawn of McQuarrie Memorial Hall, 2800 ft. 9 Sep 1947, *Galway 2215G* (SMU). Turner's view of *O. corniculata* var. *pilosa* as widespread through Mexico (1994) is not corroborated in the present study, which indicates that it primarily occurs in northwestern Mexico, with scattered localities to the east in Nuevo León.

OXALIS ALBICANS Kunth, Nov. Gen. Sp. 5(qto.): 244. 1822

Oxalis corniculata subsp. *albicans* (Kunth) Lourteig, Phytologia 42: 137. 1979.

Oxalis wrightii A. Gray, Smithsonian Contr. Knowl. 3(5): 27. 1852.

Oxalis corniculata var. *wrightii* (A. Gray) B.L. Turner, Phytologia 77: 3. 1994.

Oxalis pilosa var. *wrightii* (A. Gray) Wieg., Rhodora 28: 67. 1926.

Flowering Apr–Aug(–Oct). Desert scrub, grasslands, mesquite-acacia, pinyon-juniper, oak-pine-juniper, oak-buckthorn, riparian woodland (sycamore-hackberry-walnut-ash-willow), creek

sides, meadows, washes, hillsides, ravines, canyons, disturbed sites; (600–)700–1900(–2100) m; Arizona, California, New Mexico, southwestern Texas; widespread in Mexico.

Oxalis albicans is uncommon in California, documented by the following collection: Los Angeles Co., foothills of San Gabriel Mts., West Debris Basin, Brown School for Girls, rocky S slope, 1500 ft, 21 Mar 1968, *Wheeler s.n.* (ASU).

Turner's concept of *Oxalis corniculata* var. *wrightii*, judging from his map (1994, Fig. 1) appears mostly to comprise western populations of *O. dillenii* Jacq., although *O. wrightii* sensu stricto (typified by a collection from Jeff Davis Co. in trans-Pecos Texas) is a synonym of *O. albicans*. The morphological concept here of *O. albicans* is essentially similar to that of Eiten (1963) and of Lourteig (1979, mostly from the geographical range circumscribed by her specimen citations).

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